

In relation to Point V

Substantiated opinion with regard to the novelty, the inventive activity and the industrial application; documents and interpretations for the support of this assessment

1 The following documents are referred to:

D1: GB 836 920

D2: US-A-2 741 454

D3: JP 63 253125

D4: GB 661 078

D5: US-A-2 861 823

2 The application under consideration does not fulfill the requirements of Article 33(1) PCT, because the subject matter of claim 1 within the meaning of Article 33(2) PCT is not novel.

2.1 Document D1 discloses (the references in brackets refer to this document) the rotor of a turbo-engine with a hollow shaft (10) installed coaxially to its rotational axis, which on both sides on the end face is supported on two axially oppositely disposed sections (16,17,18,19) of the rotor and encloses an inner cavity. The hollow shaft (10) itself, viewed in the axial direction of the rotor, is formed from a plurality of abutting rings (in D1 designated as segments (P.1, line 77)), wherein the rings reciprocally abutting and abutting upon the sections of the rotor externally define the cavity. Furthermore, it follows especially from Fig.1 or from the section on P.1, line 84 as the case may be that each ring is constructed I-shaped in cross section, wherein the web (12) of the I-shape extends in the radial direction of the rotor. The I-shaped cross section of the rings results consequently from the inner cylindrical section (14), the web (12) and also the widened contour (15) in the region of the blade fastening.

3 Furthermore, the application under consideration does not fulfill the requirements of Article 33(1) PCT because the subject matter of claim 1 does not involve an inventive step within the meaning of Article 33(3).

As implied from D5, distance rings (designated as "rotor disks" 1) with I-shaped cross sections are well-known (see Fig.1 and Col.1,L.64-Col.2,L.11). These rings do

not just abut against one another but they are clamped with spacing with the rotor blades (5) and corresponding distance sleeves (4) so that they form a rotor shaft with a cavity enclosed therein. The shape of the rings is selected so that they have a relatively high rigidity with low weight. To the specialist such shapes or profiles under the definition of T-beam or double-T-beam are well-known, which are characterized by a particularly favorable ratio of mass to bending resistance moment. A transfer of this form to rings, as are disclosed for example in D4 under the designation numbers (23a,23b), appears to be an obvious course of action which requires no inventive activity of the specialist. D4 is in this connection a possible starting point as in D4 a rotor within the meaning of the application is described which is provided from segmented rings between a compressor disk (38) attached to a compressor and a turbine disk (22) attached to a turbine.

- 4 The dependent claims 2-6 and 10-14 contain no features which in combination with the features of any other claim to which they refer fulfill the requirements of the PCT with regard to novelty or inventive activity. The subject matter of these claims is either already disclosed by D1 or inferred from the combination of D1 with the documents D2-D4 (see the documents D2-D4 according to their indexing in the search report and the corresponding indicated passages).
- 5 The feature combination contained in the dependent claims 7-9 is neither known from the present prior art nor is it made obvious by it. The arguments for it are the following: an arrangement of the flanges (43) and (46) of the I-shaped rings in such a way that between the radially inner flanges and the radially outer flanges additional cavities (66) result, is disclosed by none of the documents D1-D5, nor are references to such an arrangement to be found in the documents.
- 6 Claims 13 and 14 are related to claims 10 or 11 as the case may be. Their subject matter indeed contains a turbo-engine which in turn is subject matter of claim 12. For reasons of clarity (Art.6 PCT) claims 13 and 14 have each consequently had to be referred to claim 12.
- 7 The invention is industrially applicable (Art.33(4)PCT)) to the field of gas turbines.